



SEQUENCE LISTING

<110> BioHessan, Inc.
Woodbury, New York
deVos, Theo
Irani, Meher

<120> Recombinant Fusion Proteins with High Affinity Binding to Gold
and Applications Thereof

<130> Fusionpatent.doc

<140> US 10/671,995

<141> 2003-09-26

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<213> Escherichia coli

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<223> Expression plasmid pPA-GBP, for His6-protein A-GBP. Vector is
pQE-80L (Qiagen). CDS for Protein A (nucleotides 160-528) is from
pEZZ18 (Amersham). CDS for GBP (nucleotides 565-858) is from
pSB3053 from (Brown, Nat. Biotechnol. 15:269-272, 1997).

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<221> CDS

<222> (115)..(885)

<223> CDS for fusion protein His6-protein A-GBP consisting of 257 amino
acid residues.

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Met
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aga gga tcg cat cac cat cac cat cac gga tcc ggt tct ggt gcg caa 165
Arg Gly Ser His His His His His His Gly Ser Gly Ser Gly Ala Gln
5 10 15

cac gat gaa gcc gta gac aac aaa ttc aac aaa gaa caa caa aac gcg 213
His Asp Glu Ala Val Asp Asn Lys Phe Asn Lys Glu Gln Gln Asn Ala
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ttc tat gag atc tta cat tta cct aac tta aac gaa gaa caa cga aac 261
Phe Tyr Glu Ile Leu His Leu Pro Asn Leu Asn Glu Glu Gln Arg Asn
35 40 45

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Ala Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Leu

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<223> Expression plasmid pStreptavidin-GBP for His6-streptavidin-GBP.
pQE-80L vector(Qiagen). CDS core streptavidin(169-531), (Chilkoti
et al., Proc Natl Acad Sci USA 92:1754-1758, 1995). CDS GBP
(559-852), pSB3053, (Brown, Nat. Biotechnol. 15:269-272, 1997).

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<221> CDS
<222> (115)..(879)
<223> CDS for fusion protein His6-streptavidin-GBP consisting of 255
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gcaactttat ccgcctccat ccagtctatt aattgttgcc gggaagctag agtaagtagt	4659
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tcgtcgtttg gtatggcttc attcagctcc ggttccaac gatcaaggcg agttacatga	4779
tccccatgt tgtgcaaaaa agcggtagc tccttcggtc ctccgatcgt tgtcagaagt	4839
aagttggccg cagtgttatc actcatgggt atggcagcac tgcataattc tcttactgtc	4899
atgccatccg taagatgctt ttctgtgact ggtgagtact caaccaagtc attctgagaa	4959
tagtgtatgc ggcgaccgag ttgctcttgc ccggcgtaa tacgggataa taccgcgcca	5019
catagcagaa ctttaaaagt gtcattcatt ggaaaacgtt cttcggggag aaaactctca	5079
aggatcttac cgctgttgag atccagttcg atgtaacca ctcgtgcacc caactgatct	5139
tcagcatctt ttactttcac cagcgtttct gggtagcaa aaacaggaag gcaaaatgcc	5199
gcaaaaaagg gaataagggc gacacggaaa tgttgaatac tcatactctt cttttttcaa	5259
tattattgaa gcatttatca gggttattgt ctcatgagcg gatacatatt tgaatgtatt	5319
tagaaaaata aacaaatagg ggttccgcgc acatttccc gaaaagtgcc acctgacgtc	5379
taagaaacca ttattatcat gacattaacc tataaaaata ggcgtatcac gaggcccttt	5439
cgtcttcac	5448

<210> 3
 <211> 1182
 <212> DNA

<213> Escherichia coli

<220>

<223> Sequence shows CDS portion (115-1293) of the expression plasmid, pPA-GBP-PA for fusion protein His6-protein A-GBP-protein A. The total length of the plasmid is 5859 base pairs. The origin of the basic vector and other CDSs is the same as pPA-GBP.

<220>

<221> CDS

<222> (1)..(1179)

<223> CDS for fusion protein His6-protein A-GBP-protein A consisting of 393 amino acid residues.

<400> 3

atg aga gga tcg cat cac cat cac cat cac gga tcc ggt tct ggt gcg	48
Met Arg Gly Ser His His His His His His Gly Ser Gly Ser Gly Ala	
1 5 10 15	
caa cac gat gaa gcc gta gac aac aaa ttc aac aaa gaa caa caa aac	96
Gln His Asp Glu Ala Val Asp Asn Lys Phe Asn Lys Glu Gln Gln Asn	
20 25 30	
gcg ttc tat gag atc tta cat tta cct aac tta aac gaa gaa caa cga	144
Ala Phe Tyr Glu Ile Leu His Leu Pro Asn Leu Asn Glu Glu Gln Arg	
35 40 45	
aac gcc ttc atc caa agt tta aaa gat gac cca agc caa agc gct aac	192
Asn Ala Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn	
50 55 60	
ctt tta gca gaa gct aaa aag cta aat gat gct cag gcg ccg aaa gta	240
Leu Leu Ala Glu Ala Lys Lys Leu Asn Asp Ala Gln Ala Pro Lys Val	
65 70 75 80	
gac aac aaa ttc aac aaa gaa caa caa aac gcg ttc tat gag atc tta	288
Asp Asn Lys Phe Asn Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu	
85 90 95	
cat tta cct aac tta aac gaa gaa caa cga aac gcc ttc atc caa agt	336
His Leu Pro Asn Leu Asn Glu Glu Gln Arg Asn Ala Phe Ile Gln Ser	
100 105 110	
tta aaa gat gac cca agc caa agc gct aac ctt tta gca gaa gct aaa	384
Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Leu Leu Ala Glu Ala Lys	
115 120 125	
aag cta aat gat gct cag gcg ccg aaa gta gac gcg aat tcg agc tct	432
Lys Leu Asn Asp Ala Gln Ala Pro Lys Val Asp Ala Asn Ser Ser Ser	
130 135 140	
ggt agt ggc aat ggt cat atg cat gga aaa act cag gca acc agc ggg	480
Gly Ser Gly Asn Gly His Met His Gly Lys Thr Gln Ala Thr Ser Gly	
145 150 155 160	

act atc cag agc atg cat gga aaa act cag gca acc agc ggg act atc Thr Ile Gln Ser Met His Gly Lys Thr Gln Ala Thr Ser Gly Thr Ile 165 170 175	528
cag agc atg cat gga aaa act cag gca acc agc ggg act atc cag agc Gln Ser Met His Gly Lys Thr Gln Ala Thr Ser Gly Thr Ile Gln Ser 180 185 190	576
atg cat gga aaa act cag gca acc agc ggg act atc cag agc atg cat Met His Gly Lys Thr Gln Ala Thr Ser Gly Thr Ile Gln Ser Met His 195 200 205	624
gga aaa act cag gca acc agc ggg act atc cag agc atg cat gga aaa Gly Lys Thr Gln Ala Thr Ser Gly Thr Ile Gln Ser Met His Gly Lys 210 215 220	672
act cag gca acc agc ggg act atc cag agc atg cat gga aaa att cag Thr Gln Ala Thr Ser Gly Thr Ile Gln Ser Met His Gly Lys Ile Gln 225 230 235 240	720
gca acc agc ggg act atc cag agc atg cat gct ctg tcc ctc gag ggt Ala Thr Ser Gly Thr Ile Gln Ser Met His Ala Leu Ser Leu Glu Gly 245 250 255	768
ggc gga tcc ggt tct ggt gcg caa cac gat gaa gcc gta gac aac aaa Gly Gly Ser Gly Ser Gly Ala Gln His Asp Glu Ala Val Asp Asn Lys 260 265 270	816
ttc aac aaa gaa caa caa aac gcg ttc tat gag atc tta cat tta cct Phe Asn Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu His Leu Pro 275 280 285	864
aac tta aac gaa gaa caa cga aac gcc ttc atc caa agt tta aaa gat Asn Leu Asn Glu Glu Gln Arg Asn Ala Phe Ile Gln Ser Leu Lys Asp 290 295 300	912
gac cca agc caa agc gct aac ctt tta gca gaa gct aaa aag cta aat Asp Pro Ser Gln Ser Ala Asn Leu Leu Ala Glu Ala Lys Lys Leu Asn 305 310 315 320	960
gat gct cag gcg ccg aaa gta gac aac aaa ttc aac aaa gaa caa caa Asp Ala Gln Ala Pro Lys Val Asp Asn Lys Phe Asn Lys Glu Gln Gln 325 330 335	1008
aac gcg ttc tat gag atc tta cat tta cct aac tta aac gaa gaa caa Asn Ala Phe Tyr Glu Ile Leu His Leu Pro Asn Leu Asn Glu Glu Gln 340 345 350	1056
cga aac gcc ttc atc caa agt tta aaa gat gac cca agc caa agc gct Arg Asn Ala Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala 355 360 365	1104
aac ctt tta gca gaa gct aaa aag cta aat gat gct cag gcg ccg aaa Asn Leu Leu Ala Glu Ala Lys Lys Leu Asn Asp Ala Gln Ala Pro Lys 370 375 380	1152
gta gac gcg aat tcg agc tct ggt ggc taa	1182

Val Asp Ala Asn Ser Ser Ser Gly Gly
385 390

<210> 4
<211> 1170
<212> DNA
<213> Escherichia coli

<220>
<223> CDS portion (115-1281) of the expression plasmid,
pStrept-GBP-Strept (total length 5833 base pairs) for fusion
protein His6-streptavidin-GBP-streptavidin. Vector and other CDSs
are the same as pPA-GBP and pStreptavidin-GBP.

<220>
<221> CDS
<222> (1)..(1167)
<223> CDS for fusion protein His6-streptavidin-GBP-streptavidin
consisting of 389 amino acid residues.

<400> 4
atg aga gga tcg cat cac cat cac cat cac gga tcc ggt tct ggt ggc 48
Met Arg Gly Ser His His His His His His Gly Ser Gly Ser Gly Gly
1 5 10 15

cat atg gct gaa gct ggt atc acc ggc acc tgg tac aac cag ctg gga 96
His Met Ala Glu Ala Gly Ile Thr Gly Thr Trp Tyr Asn Gln Leu Gly
20 25 30

tcc acc ttc atc gtt acc gct ggt gct gac ggt gct ctg acc ggt acc 144
Ser Thr Phe Ile Val Thr Ala Gly Ala Asp Gly Ala Leu Thr Gly Thr
35 40 45

tac gaa tcc gct gtt ggt aac gct gaa tct aga tac gtt ctg acc ggt 192
Tyr Glu Ser Ala Val Gly Asn Ala Glu Ser Arg Tyr Val Leu Thr Gly
50 55 60

cgt tac gac tcc gct ccg gct acc gac ggt tcc gga acc gct ctg ggt 240
Arg Tyr Asp Ser Ala Pro Ala Thr Asp Gly Ser Gly Thr Ala Leu Gly
65 70 75 80

tgg acc gtt gct tgg aaa aac aac tac cgt aac gct cac tcc gct acc 288
Trp Thr Val Ala Trp Lys Asn Asn Tyr Arg Asn Ala His Ser Ala Thr
85 90 95

acc tgg tct ggc cag tac gtt ggt ggt gct gaa gct cgt atc aac acc 336
Thr Trp Ser Gly Gln Tyr Val Gly Gly Ala Glu Ala Arg Ile Asn Thr
100 105 110

cag tgg ttg ttg acc tcc ggc acc acc gaa gct aac gcg tgg aaa tcc 384
Gln Trp Leu Leu Thr Ser Gly Thr Thr Glu Ala Asn Ala Trp Lys Ser
115 120 125

acc ctg gtt ggt cac gac acc ttc acc aaa gtt tcg agc tct ggt agt Thr Leu Val Gly His Asp Thr Phe Thr Lys Val Ser Ser Ser Gly Ser 130 135 140	432
ggc aat ggt cat atg cat gga aaa act cag gca acc agc ggg act atc Gly Asn Gly His Met His Gly Lys Thr Gln Ala Thr Ser Gly Thr Ile 145 150 155 160	480
cag agc atg cat gga aaa act cag gca acc agc ggg act atc cag agc Gln Ser Met His Gly Lys Thr Gln Ala Thr Ser Gly Thr Ile Gln Ser 165 170 175	528
atg cat gga aaa act cag gca acc agc ggg act atc cag agc atg cat Met His Gly Lys Thr Gln Ala Thr Ser Gly Thr Ile Gln Ser Met His 180 185 190	576
gga aaa act cag gca acc agc ggg act atc cag agc atg cat gga aaa Gly Lys Thr Gln Ala Thr Ser Gly Thr Ile Gln Ser Met His Gly Lys 195 200 205	624
act cag gca acc agc ggg act atc cag agc atg cat gga aaa act cag Thr Gln Ala Thr Ser Gly Thr Ile Gln Ser Met His Gly Lys Thr Gln 210 215 220	672
gca acc agc ggg act atc cag agc atg cat gga aaa att cag gca acc Ala Thr Ser Gly Thr Ile Gln Ser Met His Gly Lys Ile Gln Ala Thr 225 230 235 240	720
agc ggg act atc cag agc atg cat gct ctg tcc ctc gag gga tct ggt Ser Gly Thr Ile Gln Ser Met His Ala Leu Ser Leu Glu Gly Ser Gly 245 250 255	768
tct ggt ggc cat atg gct gaa gct ggt atc acc ggc acc tgg tac aac Ser Gly Gly His Met Ala Glu Ala Gly Ile Thr Gly Thr Trp Tyr Asn 260 265 270	816
cag ctg gga tcc acc ttc atc gtt acc gct ggt gct gac ggt gct ctg Gln Leu Gly Ser Thr Phe Ile Val Thr Ala Gly Ala Asp Gly Ala Leu 275 280 285	864
acc ggt acc tac gaa tcc gct gtt ggt aac gct gaa tct aga tac gtt Thr Gly Thr Tyr Glu Ser Ala Val Gly Asn Ala Glu Ser Arg Tyr Val 290 295 300	912
ctg acc ggt cgt tac gac tcc gct ccg gct acc gac ggt tcc gga acc Leu Thr Gly Arg Tyr Asp Ser Ala Pro Ala Thr Asp Gly Ser Gly Thr 305 310 315 320	960
gct ctg ggt tgg acc gtt gct tgg aaa aac aac tac cgt aac gct cac Ala Leu Gly Trp Thr Val Ala Trp Lys Asn Asn Tyr Arg Asn Ala His 325 330 335	1008
tcc gct acc acc tgg tct ggc cag tac gtt ggt ggt gct gaa gct cgt Ser Ala Thr Thr Trp Ser Gly Gln Tyr Val Gly Gly Ala Glu Ala Arg 340 345 350	1056
atc aac acc cag tgg ttg ttg acc tcc ggc acc acc gaa gct aac gcg	1104

Ile	Asn	Thr	Gln	Trp	Leu	Leu	Thr	Ser	Gly	Thr	Thr	Glu	Ala	Asn	Ala		
	355						360					365					
tgg	aaa	tcc	acc	ctg	ggt	ggt	cac	gac	acc	ttc	acc	aaa	ggt	tcg	agc		1152
Trp	Lys	Ser	Thr	Leu	Val	Gly	His	Asp	Thr	Phe	Thr	Lys	Val	Ser	Ser		
	370					375					380						
tca	agc	tta	att	agc	tga												1170
Ser	Ser	Leu	Ile	Ser													
	385																

<210> 5
 <211> 1176
 <212> DNA
 <213> Escherichia coli

<220>
 <223> CDS portion (115-1287) of the expression plasmid, pPA-GBP-Streptavidin (total length 5839 base pairs) for fusion protein His6-PA-GBP-streptavidin. Vector and other CDSs are the same as pPA-GBP and pStreptavidin-GBP.

<220>
 <221> CDS
 <222> (1)..(1173)
 <223> CDS for fusion protein His6-PA-GBP-streptavidin consisting of 391 amino acid residues.

<400>	5																
atg	aga	gga	tcg	cat	cac	cat	cac	cat	cac	gga	tcc	ggt	tct	ggt	gcg		48
Met	Arg	Gly	Ser	His	His	His	His	His	His	Gly	Ser	Gly	Ser	Gly	Ala		
1				5					10					15			
caa	cac	gat	gaa	gcc	gta	gac	aac	aaa	ttc	aac	aaa	gaa	caa	caa	aac		96
Gln	His	Asp	Glu	Ala	Val	Asp	Asn	Lys	Phe	Asn	Lys	Glu	Gln	Gln	Asn		
			20					25					30				
gcg	ttc	tat	gag	atc	tta	cat	tta	cct	aac	tta	aac	gaa	gaa	caa	cga		144
Ala	Phe	Tyr	Glu	Ile	Leu	His	Leu	Pro	Asn	Leu	Asn	Glu	Glu	Gln	Arg		
		35					40					45					
aac	gcc	ttc	atc	caa	agt	tta	aaa	gat	gac	cca	agc	caa	agc	gct	aac		192
Asn	Ala	Phe	Ile	Gln	Ser	Leu	Lys	Asp	Asp	Pro	Ser	Gln	Ser	Ala	Asn		
	50					55					60						
ctt	tta	gca	gaa	gct	aaa	aag	cta	aat	gat	gct	cag	gcg	ccg	aaa	gta		240
Leu	Leu	Ala	Glu	Ala	Lys	Lys	Leu	Asn	Asp	Ala	Gln	Ala	Pro	Lys	Val		
65					70				75					80			
gac	aac	aaa	ttc	aac	aaa	gaa	caa	caa	aac	gcg	ttc	tat	gag	atc	tta		288
Asp	Asn	Lys	Phe	Asn	Lys	Glu	Gln	Gln	Asn	Ala	Phe	Tyr	Glu	Ile	Leu		
				85					90					95			

cat tta cct aac tta aac gaa gaa caa cga aac gcc ttc atc caa agt	336
His Leu Pro Asn Leu Asn Glu Glu Gln Arg Asn Ala Phe Ile Gln Ser	
100 105 110	
tta aaa gat gac cca agc caa agc gct aac ctt tta gca gaa gct aaa	384
Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Leu Leu Ala Glu Ala Lys	
115 120 125	
aag cta aat gat gct cag gcg ccg aaa gta gac gcg aat tcg agc tct	432
Lys Leu Asn Asp Ala Gln Ala Pro Lys Val Asp Ala Asn Ser Ser Ser	
130 135 140	
ggg agt ggc aat ggt cat atg cat gga aaa act cag gca acc agc ggg	480
Gly Ser Gly Asn Gly His Met His Gly Lys Thr Gln Ala Thr Ser Gly	
145 150 155 160	
act atc cag agc atg cat gga aaa act cag gca acc agc ggg act atc	528
Thr Ile Gln Ser Met His Gly Lys Thr Gln Ala Thr Ser Gly Thr Ile	
165 170 175	
cag agc atg cat gga aaa act cag gca acc agc ggg act atc cag agc	576
Gln Ser Met His Gly Lys Thr Gln Ala Thr Ser Gly Thr Ile Gln Ser	
180 185 190	
atg cat gga aaa act cag gca acc agc ggg act atc cag agc atg cat	624
Met His Gly Lys Thr Gln Ala Thr Ser Gly Thr Ile Gln Ser Met His	
195 200 205	
gga aaa act cag gca acc agc ggg act atc cag agc atg cat gga aaa	672
Gly Lys Thr Gln Ala Thr Ser Gly Thr Ile Gln Ser Met His Gly Lys	
210 215 220	
act cag gca acc agc ggg act atc cag agc atg cat gga aaa att cag	720
Thr Gln Ala Thr Ser Gly Thr Ile Gln Ser Met His Gly Lys Ile Gln	
225 230 235 240	
gca acc agc ggg act atc cag agc atg cat gct ctg tcc ctc gag gga	768
Ala Thr Ser Gly Thr Ile Gln Ser Met His Ala Leu Ser Leu Glu Gly	
245 250 255	
tct ggt tct ggt ggc cat atg gct gaa gct ggt atc acc ggc acc tgg	816
Ser Gly Ser Gly Gly His Met Ala Glu Ala Gly Ile Thr Gly Thr Trp	
260 265 270	
tac aac cag ctg gga tcc acc ttc atc gtt acc gct ggt gct gac ggt	864
Tyr Asn Gln Leu Gly Ser Thr Phe Ile Val Thr Ala Gly Ala Asp Gly	
275 280 285	
gct ctg acc ggt acc tac gaa tcc gct gtt ggt aac gct gaa tct aga	912
Ala Leu Thr Gly Thr Tyr Glu Ser Ala Val Gly Asn Ala Glu Ser Arg	
290 295 300	
tac gtt ctg acc ggt cgt tac gac tcc gct ccg gct acc gac ggt tcc	960
Tyr Val Leu Thr Gly Arg Tyr Asp Ser Ala Pro Ala Thr Asp Gly Ser	
305 310 315 320	

gga acc gct ctg ggt tgg acc gtt gct tgg aaa aac aac tac cgt aac	1008
Gly Thr Ala Leu Gly Trp Thr Val Ala Trp Lys Asn Asn Tyr Arg Asn	
325 330 335	
gct cac tcc gct acc acc tgg tct ggc cag tac gtt ggt ggt gct gaa	1056
Ala His Ser Ala Thr Thr Trp Ser Gly Gln Tyr Val Gly Gly Ala Glu	
340 345 350	
gct cgt atc aac acc cag tgg ttg ttg acc tcc ggc acc acc gaa gct	1104
Ala Arg Ile Asn Thr Gln Trp Leu Leu Thr Ser Gly Thr Thr Glu Ala	
355 360 365	
aac gcg tgg aaa tcc acc ctg gtt ggt cac gac acc ttc acc aaa gtt	1152
Asn Ala Trp Lys Ser Thr Leu Val Gly His Asp Thr Phe Thr Lys Val	
370 375 380	
tcg agc tca agc tta att agc tga	1176
Ser Ser Ser Ser Leu Ile Ser	
385 390	

<210> 6
 <211> 1176
 <212> DNA
 <213> Escherichia coli

<220>
 <223> CDS portion (115-1287) of the expression plasmid,
 pStreptavidin-GBP-PA (total length 5853 base pairs) for fusion
 protein His6-streptavidin-GBP-PA. Vector and other CDSs are the
 same as pPA-GBP and pStreptavidin-GBP.

<220>
 <221> CDS
 <222> (1)..(1173)
 <223> CDS for fusion protein His6-streptavidin-GBP-PA consisting of 391
 amino acid residues.

<400> 6	
atg aga gga tcg cat cac cat cac cat cac gga tcc ggt tct ggt ggc	48
Met Arg Gly Ser His His His His His His Gly Ser Gly Ser Gly Gly	
1 5 10 15	
cat atg gct gaa gct ggt atc acc ggc acc tgg tac aac cag ctg gga	96
His Met Ala Glu Ala Gly Ile Thr Gly Thr Trp Tyr Asn Gln Leu Gly	
20 25 30	
tcc acc ttc atc gtt acc gct ggt gct gac ggt gct ctg acc ggt acc	144
Ser Thr Phe Ile Val Thr Ala Gly Ala Asp Gly Ala Leu Thr Gly Thr	
35 40 45	
tac gaa tcc gct gtt ggt aac gct gaa tct aga tac gtt ctg acc ggt	192
Tyr Glu Ser Ala Val Gly Asn Ala Glu Ser Arg Tyr Val Leu Thr Gly	

50	55	60	
cgt tac gac tcc gct ccg gct acc gac ggt tcc gga acc gct ctg ggt Arg Tyr Asp Ser Ala Pro Ala Thr Asp Gly Ser Gly Thr Ala Leu Gly 65 70 75 80			240
tgg acc gtt gct tgg aaa aac aac tac cgt aac gct cac tcc gct acc Trp Thr Val Ala Trp Lys Asn Asn Tyr Arg Asn Ala His Ser Ala Thr 85 90 95			288
acc tgg tct ggc cag tac gtt ggt ggt gct gaa gct cgt atc aac acc Thr Trp Ser Gly Gln Tyr Val Gly Gly Ala Glu Ala Arg Ile Asn Thr 100 105 110			336
cag tgg ttg ttg acc tcc ggc acc acc gaa gct aac gcg tgg aaa tcc Gln Trp Leu Leu Thr Ser Gly Thr Thr Glu Ala Asn Ala Trp Lys Ser 115 120 125			384
acc ctg gtt ggt cac gac acc ttc acc aaa gtt tcg agc tct ggt agt Thr Leu Val Gly His Asp Thr Phe Thr Lys Val Ser Ser Ser Gly Ser 130 135 140			432
ggc aat ggt cat atg cat gga aaa act cag gca acc agc ggg act atc Gly Asn Gly His Met His Gly Lys Thr Gln Ala Thr Ser Gly Thr Ile 145 150 155 160			480
cag agc atg cat gga aaa act cag gca acc agc ggg act atc cag agc Gln Ser Met His Gly Lys Thr Gln Ala Thr Ser Gly Thr Ile Gln Ser 165 170 175			528
atg cat gga aaa act cag gca acc agc ggg act atc cag agc atg cat Met His Gly Lys Thr Gln Ala Thr Ser Gly Thr Ile Gln Ser Met His 180 185 190			576
gga aaa act cag gca acc agc ggg act atc cag agc atg cat gga aaa Gly Lys Thr Gln Ala Thr Ser Gly Thr Ile Gln Ser Met His Gly Lys 195 200 205			624
act cag gca acc agc ggg act atc cag agc atg cat gga aaa act cag Thr Gln Ala Thr Ser Gly Thr Ile Gln Ser Met His Gly Lys Thr Gln 210 215 220			672
gca acc agc ggg act atc cag agc atg cat gga aaa att cag gca acc Ala Thr Ser Gly Thr Ile Gln Ser Met His Gly Lys Ile Gln Ala Thr 225 230 235 240			720
agc ggg act atc cag agc atg cat gct ctg tcc ctc gag ggt ggc gga Ser Gly Thr Ile Gln Ser Met His Ala Leu Ser Leu Glu Gly Gly Gly 245 250 255			768
tcc ggt tct ggt gcg caa cac gat gaa gcc gta gac aac aaa ttc aac Ser Gly Ser Gly Ala Gln His Asp Glu Ala Val Asp Asn Lys Phe Asn 260 265 270			816
aaa gaa caa caa aac gcg ttc tat gag atc tta cat tta cct aac tta Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu His Leu Pro Asn Leu 275 280 285			864

aac gaa gaa caa cga aac gcc ttc atc caa agt tta aaa gat gac cca Asn Glu Glu Gln Arg Asn Ala Phe Ile Gln Ser Leu Lys Asp Asp Pro 290 295 300	912
agc caa agc gct aac ctt tta gca gaa gct aaa aag cta aat gat gct Ser Gln Ser Ala Asn Leu Leu Ala Glu Ala Lys Lys Leu Asn Asp Ala 305 310 315 320	960
cag gcg ccg aaa gta gac aac aaa ttc aac aaa gaa caa caa aac gcg Gln Ala Pro Lys Val Asp Asn Lys Phe Asn Lys Glu Gln Gln Asn Ala 325 330 335	1008
ttc tat gag atc tta cat tta cct aac tta aac gaa gaa caa cga aac Phe Tyr Glu Ile Leu His Leu Pro Asn Leu Asn Glu Glu Gln Arg Asn 340 345 350	1056
gcc ttc atc caa agt tta aaa gat gac cca agc caa agc gct aac ctt Ala Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Leu 355 360 365	1104
tta gca gaa gct aaa aag cta aat gat gct cag gcg ccg aaa gta gac Leu Ala Glu Ala Lys Lys Leu Asn Asp Ala Gln Ala Pro Lys Val Asp 370 375 380	1152
gcg aat tcg agc tct ggt ggc taa Ala Asn Ser Ser Ser Gly Gly 385 390	1176

<210> 7
 <211> 393
 <212> DNA
 <213> Escherichia coli

<220>
 <223> CDS portion (115-504) of the expression plasmid, pGBP (total length 5073 base pairs) for fusion protein His6-GBP. Vector and other CDSs are the same as pPA-GBP.

<220>
 <221> CDS
 <222> (1)..(390)
 <223> CDS for fusion protein His6-GBP consisting of 130 amino acid residues.

<400> 7 atg aga gga tcg cat cac cat cac cat cac gga tcc gga ggt ggg agc Met Arg Gly Ser His His His His His His Gly Ser Gly Gly Gly Ser 1 5 10 15	48
tct ggt agt ggc aat ggt cat atg cat gga aaa act cag gca acc agc Ser Gly Ser Gly Asn Gly His Met His Gly Lys Thr Gln Ala Thr Ser	96

tct ggt agt ggc aat ggt cat atg cat gga aaa act cag gca acc agc Ser Gly Ser Gly Asn Gly His Met His Gly Lys Thr Gln Ala Thr Ser 20 25 30	96
ggg act atc cag agc atg cat gga aaa act cag gca acc agc ggg act Gly Thr Ile Gln Ser Met His Gly Lys Thr Gln Ala Thr Ser Gly Thr 35 40 45	144
atc cag agc atg cat gga aaa act cag gca acc agc ggg act atc cag Ile Gln Ser Met His Gly Lys Thr Gln Ala Thr Ser Gly Thr Ile Gln 50 55 60	192
agc atg cat gga aaa act cag gca acc agc ggg act atc cag agc atg Ser Met His Gly Lys Thr Gln Ala Thr Ser Gly Thr Ile Gln Ser Met 65 70 75 80	240
cat gga aaa act cag gca acc agc ggg act atc cag agc atg cat gga His Gly Lys Thr Gln Ala Thr Ser Gly Thr Ile Gln Ser Met His Gly 85 90 95	288
aaa act cag gca acc agc ggg act atc cag agc atg cat gga aaa att Lys Thr Gln Ala Thr Ser Gly Thr Ile Gln Ser Met His Gly Lys Ile 100 105 110	336
cag gca acc agc ggg act atc cag agc atg cat gct ctg tcc ctc gag Gln Ala Thr Ser Gly Thr Ile Gln Ser Met His Ala Leu Ser Leu Glu 115 120 125	384
ggt ggt gga agc tct ggt agt ggc aat ggt cat atg cat gga aaa act Gly Gly Gly Ser Ser Gly Ser Gly Asn Gly His Met His Gly Lys Thr 130 135 140	432
cag gca acc agc ggg act atc cag agc atg cat gga aaa act cag gca Gln Ala Thr Ser Gly Thr Ile Gln Ser Met His Gly Lys Thr Gln Ala 145 150 155 160	480
acc agc ggg act atc cag agc atg cat gga aaa act cag gca acc agc Thr Ser Gly Thr Ile Gln Ser Met His Gly Lys Thr Gln Ala Thr Ser 165 170 175	528
ggg act atc cag agc atg cat gga aaa act cag gca acc agc ggg act Gly Thr Ile Gln Ser Met His Gly Lys Thr Gln Ala Thr Ser Gly Thr 180 185 190	576
atc cag agc atg cat gga aaa act cag gca acc agc ggg act atc cag Ile Gln Ser Met His Gly Lys Thr Gln Ala Thr Ser Gly Thr Ile Gln 195 200 205	624
agc atg cat gga aaa act cag gca acc agc ggg act atc cag agc atg Ser Met His Gly Lys Thr Gln Ala Thr Ser Gly Thr Ile Gln Ser Met 210 215 220	672
cat gga aaa att cag gca acc agc ggg act atc cag agc atg cat gct His Gly Lys Ile Gln Ala Thr Ser Gly Thr Ile Gln Ser Met His Ala 225 230 235 240	720
ctg tcc ctc gag ggt ccg taa	741

Leu Ser Leu Glu Gly Pro
245